LAW COMMISSION OF ENGLAND AND WALES

OVERVIEW: AVIATION AUTONOMY CONSULTATION

1. This is a brief overview of the Law Commission consultation paper on autonomy in aviation. In September 2022, the Civil Aviation Authority ("CAA"), and the Department for Transport asked the Law Commission to review the UK's regulatory framework to prepare the UK for autonomy in aviation. This project forms part of, and has been funded by, the UK Research and Innovation Future Flight Challenge.

2. We are reviewing aviation law. There is an extensive amount of it, and much of the law is very prescriptive. Our main task is to identify where there are gaps, uncertainties, or provisions which could prevent the safe deployment of highly automated and autonomous aviation systems. Our aim is to propose a set of reforms which will prepare the legislative and regulatory framework for future advances in automation and, ultimately, autonomous flight.

3. Given the forward-looking nature of this project, our work is focused on three use cases. They are:

    (1) drones (defined for these purposes as remotely piloted, non-passenger carrying vehicles);

    (2) advanced air mobility (and in particular Vertical Take-off and Landing aircraft "VTOLs") providing short journeys for up to ten people); and

    (3) air traffic management and air navigation services (including communications, navigation and surveillance and aeronautical information services).

4. Our present consultation paper focuses on the first two use cases. The third will be the subject of a second consultation paper due later this year.

5. We aim to publish a final report with recommendations for changes to the law towards the end of 2025.

6. We highlight here a selection of our provisional proposals. The full list of proposals can be found in the paper itself, and in a fuller summary, both available on our website. We seek views by **27 May 2024**.

Concepts and terminology

7. The aviation field is replete with specialist terminology. Our consultation paper discusses what exactly is meant by "autonomous" and "autonomy" in the aviation context.

8. We describe many of the terms that are used by the current regulatory framework, and in particular, the term "Unmanned Aircraft System" or "UAS", which is used in current legislation. We have chosen to use "uncrewed" rather than "unmanned" in this paper, on the basis that it is gender neutral.

9. We use the term "uncrewed aircraft" to describe aircraft without a pilot on board. This can then be subdivided into aircraft which have a remote pilot, and aircraft which have no pilot at all (which we refer to as "autonomous").

10. We also adopt the term “VTOL” and the definition of this term used by the CAA – a heavier-than-air aircraft, other than an aeroplane or helicopter, capable of performing vertical procedures by means of more than two lift/thrust units and certified for one or more occupants.

The current regulatory framework

11. A specific regulatory regime for uncrewed aircraft has been devised in EU law in Regulations made under the Basic Regulation; these now form part of assimilated law in the UK. This regime consists of two complementary regulations:

    (1) UK Regulation (EU) 2019/945 (the "UAS Delegated Regulation"), which sets out requirements in relation to the design and production of UAS; and

    (2) UK Regulation (EU) 2019/947 (the "UAS Implementing Regulation"), which contains rules governing the operation of a UAS.

12. The overall approach underpinning the UAS regulatory regime is that the applicable rules and procedures should be proportionate to the nature and risk of the operation in question. This means that the characteristics of the intended UAS operation determine the applicable rules at both the design and production stage and the operation stage.

13. This framework theoretically applies to all uncrewed aircraft, from small drones to passenger-carrying aircraft. Because it covers such a wide variety of aircraft, flying in different scenarios, the regulatory regime takes a proportionate approach.

14. It does this by having three categories of operations: open, specific, and certified. The open category is intended for low-risk flights (such as flights that are relatively lightweight and do not fly over assemblies of people) and the certified is for high-risk flight (for example, flights involving carrying passengers or dangerous goods). The specific category can be seen as a residual category, covering operations which do not fall into either the open or certified categories. The Civil Aviation Authority has to authorise flights in the specific category.

Airworthiness and certification

15. Safety is at the forefront of aviation. Aircraft and other systems in aviation are subject to strict standards of airworthiness and certification. Airworthiness regulations ensure that aircraft and aviation systems are acceptably safe both before they are deployed and on a continuing basis.

16. Most operations falling within the “open” and “specific” categories are regulated by the UAS implementing and delegated regulations.[1] However, UAS falling within the ‘certified’ category, and some within the ‘specific’ category, are subject to the same certification regime as conventional aircraft.

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[1] UK Regulation (EU) 748/2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations; UK Regulation (EU) 2019/947 on the rules and procedures for the operation of unmanned aircraft.

17. We see two key challenges to the existing certification framework. First, there are gaps: there are agreed standards (or "certification specifications") for conventional aircraft, but no specific specifications for UAS in the certified category. Secondly, to enable autonomous flight aircraft will have to rely on complex AI technologies which may be difficult to certify.

18. We seek views on how current airworthiness and certification regulation might need to be adapted or developed in the light of highly automated and autonomous aircraft.

Rules of the air

19. The rules of the air are the core set of directions that must be followed when conducting aircraft operations. The rules can be seen as the "highway code" of the air and have a broad scope. They include rules about collision avoidance (for example, through setting out which aircraft has right of way); signalling; flight plans; air space classification; air traffic control systems; emergency procedures; and voice communication procedures.

20. The rules currently operate on the presumption that there will be a human in the aircraft. Discretion is given to the human pilot, with the pilot-in-command having the power to depart from the rules in circumstances that render such departure absolutely necessary in the interests of safety.

21. We seek views on how the rules of the air should be adapted or developed to account for operations with a remote pilot or those that involve highly automated and autonomous aircraft.

VTOLS

22. One of the use cases which are being developed are uncrewed passenger aircraft to be used as a form of "urban air mobility": that is, short trips in urban locations. The type of aircraft we consider here can take off and land vertically (a little like a helicopter). These are beginning to be deployed around the world: there are plans to use them during the Paris Olympic Games. At first these will be piloted by a pilot on board. In time, however, industry plans use remotely piloted VTOLs. The possibility of aircraft carrying passengers, but no pilot, raises some legal problems.

23. At the moment the pilot has many responsibilities both for the operation of the aircraft and for keeping "good order" on board. We suggest some changes for remotely piloted VTOL. For example, we propose that an operator, rather than the pilot, would be responsible for making sure no one boarding an aircraft was drunk or under the influence of drugs. A remote pilot would however still be ultimately responsible for giving safety briefings and for taking action if a passenger disturbed a flight. We also seek views on whether one remote pilot could be responsible for piloting more than one VTOL. To date it has not been possible to have one person piloting more than one passenger-carrying aircraft, and so the law is silent on this. We think the position should be clear, and ask whether there should be an upper limit on the number of aircraft piloted by one person.

24. As well as remote piloting, we consider a situation where the aircraft is fully autonomous, and there is no remote pilot at all. We ask whether there might still be a role for a human in overseeing the flight and providing support to passengers, even if that person was not able to intervene in the course of the flight. Finally, we ask for views on how these new

types of services can be made as safe and accessible as possible for those that have different travel needs.

Drones

25. Drones are uncrewed aircraft which are generally smaller than traditional aircraft, and are unoccupied. They can be remotely piloted or autonomous. Drones are being trialled by businesses in the delivery sector to transport goods. However, drones are also being trialled for use in: emergency response; infrastructure inspection; agriculture; wildlife and historical conservation; surveillance; construction and manufacturing; and as temporary flying cellular networks.

26. Many of these use cases require a higher level of automation than has been common to date. For example, several require a drone to be able to fly beyond the visual line of sight of an operator, or “BVLOS”. A key question when considering how regulation can accommodate the use of automated drones is the level of risk they pose to other airspace users and the public generally.

27. Our paper seeks views on the requirements for drone operations in the specific and certified categories. We also ask about the responsibilities that the remote pilots of drones should have. Finally, we discuss and ask questions about the possibility of drone operations involving a remote pilot controlling multiple drones simultaneously – including about whether additional safeguards would be needed.

Civil liability

28. The paper explores the civil liability implications for those involved in the operations of uncrewed aircraft systems. From the earliest days of aviation, having straightforward mechanisms for compensation following an accident has been seen as key to its commercial success. This will continue to be important as uncrewed aircraft become more prevalent.

29. We ask for views on the adequacy of the current regime for civil liability in relation to uncrewed aircraft systems. In particular we look at some of the provisions which relate to: accidents; surface damage; and private nuisance and trespass. We also discuss insurance requirements placed on air carriers and operators and consider the application of the existing framework to uncrewed aircraft.

Criminal liability

30. We also look at the current regime for criminal liability in aviation and consider how it might apply to operations involving uncrewed aircraft. There are numerous criminal offences related to aviation: the Air Navigation Order 2016, for example, attaches criminal liability to over 500 of its provisions.

31. We consider whether this approach will be appropriate for uncrewed operations. In many instances, liability will attach to an operator. We ask whether this is appropriate, and consider the available defences for operators and others such as the remote pilot.

32. We also review offences against the safety of aircraft, hijacking, the carriage of dangerous goods, and offences relating to aerodromes. We ask whether the definition of hijacking should be updated so that it can be carried out by persons not on board an aircraft.